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## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method comprising:  
~~trapping, by a processor initiating, by a guest operating system, a change in~~  
execution among schedulable entities running on a virtual machine on a processor;  
~~detecting, by the processor, the initiation of the change in execution;~~  
~~transferring control of the processor to a virtual machine monitor; and~~  
~~tracking, by the virtual machine monitor, an execution of a schedulable entity that~~  
is being switched in for execution as a result of the change in execution.
2. (Currently Amended) The method of claim 1, ~~wherein the tracking is performed~~  
~~by a privileged entity and~~ further comprising:  
calculating, by the ~~privileged entity~~ virtual machine monitor, an estimated  
resource requirement for the schedulable entity that is being switched in for execution  
from the tracking of a previous execution of the schedulable entity; and  
scheduling, by the ~~privileged entity~~ virtual machine monitor, the schedulable  
entity that is being switched in for execution according to its estimated resource  
requirement.
3. (Currently Amended) The method of claim 2, wherein ~~the privileged entity is a~~  
~~virtual machine monitor and~~ the schedulable entities are selected from the group  
consisting of processes; and threads, operating systems, ~~and child virtual machine~~  
~~monitors.~~

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4. (Currently Amended) The method of claim 2, wherein the ~~privileged entity~~  
virtual machine monitor comprises:

an idle detector to receive notice from the processor of the change in execution  
and to derive a measured value for a schedulable entity that is being switched out of  
execution;

a proportional integral derivative (PID) controller logically coupled to the idle  
detector to receive the measured value and to calculate the estimated resource  
requirement required by the schedulable entity that is being switched out of execution;  
and

a scheduler logically coupled to the PID controller to receive the estimated  
resource requirement and to determine a schedule of execution for the schedulable entity  
that is being switched out of execution.

5. (Original) The method of claim 2, wherein calculating an estimated resource  
requirement comprises:

assigning an initial value as the estimated resource requirement for the  
schedulable entity that is being switched in for execution;

reducing the estimated resource requirement for the schedulable entity if the  
schedulable entity completes execution before the estimated resource requirement is  
exhausted; and

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increasing the estimated resource requirement for the schedulable entity if the schedulable entity does not complete execution before the estimated resource requirement is exhausted.

6. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Original) The method of claim 1, wherein trapping a change in execution comprises:

detecting an instruction to change a state register that identifies a schedulable entity.

10. (Original) The method of claim 9 further comprising:

comparing, by the processor, the state register that identifies the schedulable entity being switched in for execution with a state match register that identifies a schedulable entity that is to be tracked, wherein the schedulable entity being switched into execution is tracked by the processor if the state register and the state match register match.

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11. (Original) The method of claim 1, wherein trapping a change in execution comprises:

detecting an instruction to change between privileged and non-privileged modes.

12. (Previously Amended) The method of claim 1, wherein the schedulable entities are selected from the group consisting of operating system processes, operating system threads, and instruction streams to be executed by the processor.

13. (Currently Amended) A machine-readable medium providing instructions, which when executed by a machine, causes the machine to perform operations comprising:

~~trapping, by a processor~~ initiating, by a guest operating system, a change in execution among schedulable entities running on a virtual machine on a processor;  
detecting, by the processor, the initiation of the change in execution;  
transferring control of the processor to a virtual machine monitor; and  
tracking, by the virtual machine monitor, an execution of a schedulable entity that is being switched in for execution as a result of the change in execution.

14. (Currently Amended) The machine-readable medium of claim 13, wherein the tracking is performed by ~~a privileged entity~~ the virtual machine monitor and further comprising:

calculating, by the ~~privileged entity~~ virtual machine monitor, an estimated resource requirement for the schedulable entity that is being switched in for execution based on the tracking of a previous execution of the schedulable entity; and

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scheduling, by the ~~privileged entity~~ virtual machine monitor, the schedulable entity that is being switched in for execution according to the estimated resource requirement.

15. (Currently Amended) The machine-readable medium of claim 14, wherein the ~~privileged entity is a virtual machine monitor and~~ the schedulable entities are selected from the group consisting of processes, ~~and~~ threads, ~~operating systems, and child virtual machine monitors.~~

16. (Original) The machine-readable medium of claim 14, wherein the virtual machine monitor comprises:

an idle detector to receive notice from the processor of the change in execution and to derive a measured value for a schedulable entity that is being switched out of execution;

a proportional integral derivative (PID) controller logically coupled to the idle detector to receive the measured value and to calculate the estimated resource requirement required by the schedulable entity that is being switched out of execution; and

a scheduler logically coupled to the PID controller to receive the estimated resource requirement and to determine a schedule of execution for the schedulable entity that is being switched out of execution.

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17. (Original) The machine-readable medium of claim 14, wherein calculating an estimated resource requirement comprises:

assigning an initial value as the estimated resource requirement for the schedulable entity that is being switched in for execution;

reducing the estimated resource requirement for the schedulable entity if the schedulable entity completes execution before the estimated resource requirement is exhausted; and

increasing the estimated resource requirement for the schedulable entity if the schedulable entity does not complete execution before the estimated resource requirement is exhausted.

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Original) The machine-readable medium of claim 13, wherein trapping a change in execution comprises:

detecting an instruction to change a state register that identifies a schedulable entity.

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22. (Previously Amended) The machine-readable medium of claim 13 further comprising:

comparing, by the processor, a state register that identifies the schedulable entity being switched in for execution with a state match register that identifies a schedulable entity that is to be tracked, wherein the schedulable entity being switched into execution is tracked by the processor if the state register and the state match register match.

23. (Original) The machine-readable medium of claim 13, wherein trapping a change in execution comprises:

detecting an instruction to change between privileged and non-privileged modes.

24. (Previously Amended) The machine-readable medium of claim 13, wherein the schedulable entities are selected from the group consisting of operating system processes, operating system threads, and instruction streams to be executed by the processor.

25. (Currently Amended) An apparatus comprising:

a memory;

a processing unit coupled to the memory and configured to ~~trap to detect a~~ detect a ~~privileged entity~~ a change in execution among schedulable entities running on a virtual machine initiated by a guest operating system and transfer control to a virtual machine monitor; and

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the ~~privileged entity~~ virtual machine monitor executed from the memory to cause the processing unit to track an execution of a schedulable entity that is being switched in for execution as a result of the change in execution.

26. (Currently Amended) The apparatus of claim 25, wherein the ~~privileged entity~~ virtual machine monitor further causes the processing unit to calculate an estimated resource requirement for the schedulable entity that is being switched in for execution based on the tracking of a previous execution of the schedulable entity and to schedule the schedulable entity that is being switched in for execution according to the estimated resource requirement.

27. (Currently Amended) The apparatus of claim 26, wherein ~~the privileged entity is a virtual machine monitor and~~ the schedulable entities are selected from the group consisting of processes; and threads; ~~operating systems, and child virtual machine monitors.~~

28. (Original) The apparatus of claim 27, wherein the virtual machine monitor comprises:

an idle detector to receive notice from the processing unit of the change in execution and to derive a measured value for a schedulable entity that is being switched out of execution;



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a proportional integral derivative (PID) controller logically coupled to the idle detector to receive the measured value and to calculate the estimated resource requirement for the schedulable entity that is being switched out of execution; and

a scheduler logically coupled to the PID controller to receive the estimated resource requirement and to determine a schedule of execution for the schedulable entity that is being switched out of execution.

29. (Currently Amended) The apparatus of claim 26, wherein the ~~privileged entity~~ virtual machine monitor further causes the processing unit to calculate an estimated machine resource requirement by:

assigning an initial value as the estimated resource requirement for the schedulable entity;

reducing the estimated resource requirement for the schedulable entity if the schedulable entity completes execution before the estimated resource requirement is exhausted; and

increasing the estimated resource requirement for the schedulable entity if the schedulable entity does not complete execution before the estimated resource requirement is exhausted.

30. (Original) The apparatus of claim 25, wherein the processing unit is further configured to trap a change in execution by detecting an instruction to change a state register that identifies a schedulable entity.

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31. (Original) The apparatus of claim 25, wherein the processing unit is further configured to trap a change in execution by detecting an instruction to change between privilege and non-privilege modes.

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Currently Amended) An apparatus comprising:

a processing unit configured to ~~trap detect~~ a change in execution among schedulable entities running on a virtual machine initiated by a guest operating system and transfer control to a virtual machine monitor, to compare a state register that identifies the schedulable entity being switched in for execution with a state match register that identifies a schedulable entity that is to be tracked, and to track the schedulable entity being switched into execution if the state register and the state match register match.

36. (Previously Amended) The apparatus of claim 35, wherein the schedulable entities are selected from the group consisting of operating system processes, operating system threads, and instruction streams to be executed by the processing unit.